

**A Synonymical List of American Himantariidae,  
with a Generic Key and Description of a  
New Genus (Chilopoda: Geophilomorpha: Himantariidae)**

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We understand less today about the world fauna of the Himantariidae than about that of any other major geophilomorph family. With the exception of the southwestern European and western North African himantariids, which have been revised at least twice (1, 4), our knowledge of virtually all of the remaining species is nearly limited to the descriptions of new species and elucidation of higher categories. Almost nothing is known of intraspecific variability, or of the geographical distribution of species, while much of the generic framework of the family is admittedly preliminary and certainly transitional.

Until Professor Chamberlin began his investigations of the group in this century, disclosing for the first time the previously unsuspected presence of a possibly rich and evidently highly endemic fauna in the New World, it was not believed that there was any significant concentration of species and genera outside of the Mediterranean perimeter.

Apart from the circum-Mediterranean fauna, a very few species are known today from the more eastern Old World tropics and northern subtropics, e.g. from coastal Africa, India, southeastern Asia, Japan and Korea. In addition, a relatively larger number of species and genera in recent years has been described from northern South America and Mexico, but especially from western North America. It is likely that these exceedingly long, ribbon-like centipedes are not actually as uncommon as such evidence suggests. They are probably rather abundant in the tropical and especially subtropical areas of eastern Asia and of the Americas. It is not unreasonable to suspect that owing to their retiring habits and well-known inclination to burrow in the ground the animals simply are not being collected very often.

The earliest *unquestionable* North American himantariids were described by H. C. Wood in 1862; they were *laticeps* and *taeniopsis*, both originally referred to *Strigamia*. The Texan *laticeps*, which is the type-species of *Gosiphilus*, q.v., is still preserved in the Museum of Comparative Zoology at Harvard University (No. TC-5(867)); *taeniopsis*, however, remains in question. The type is apparently lost, and its specific identity and generic assignment are uncertain.<sup>1</sup>

Today the roster of described forms is comparatively long and is growing. Undoubtedly some of the generic and specific names listed at the end of this paper will be submerged as we learn more about intraspecific variability and the systematic fabric of the whole group.

#### EMPHEROZOSTER, new genus

Like nearly all of the American genera, *Empherozoster* has a diastemate 2nd maxillary coxosternum,<sup>2</sup> lacks major paratergites, ultimate leg pretarsi, and special sternital pouches and fossulae.<sup>3</sup> Additional important diagnostic characters are the following: *intercalary* paratergites absent except on the ultimate pedal segment; coxopleura ventrally and dorsally cavitate, the pores cryptic; pore-fields present on sternites 2 through the penultimate; prosternal sclerotic lines (chitin lines) absent, i.e., not passing toward and meeting the prehensorial condyles (see Note A); prehensorial ungular basal denticle absent; antennae not flattened nor distally attenuate, excluding the first, the basal articles compressed laterally; labrum deeply embayed and centrally completely incised; mandibular pectinate lamellae numerous; 1st maxillary lappets entirely absent; ultimate pedal

<sup>1</sup> The stated type locality, Georgia, is probably incorrect. Wood subsequently admitted that owing to a confusion in vial labels, some of his species described as Georgian were actually Californian.

<sup>2</sup> Hence belongs to the subfamily Himantariinae (= tribe Himantariini, auct.).

<sup>3</sup> For an effective understanding of most of the terms and criteria employed here the reader is referred to the superb 1909 paper by Chalande and Ribaut, which stands as one of the clearest and most detailed synthetic treatments of a restricted group of chilopods.

sternite much longer than its width at midlength; ultimate pedal pretergite flanked by and separated by sutures from very large intercalary pleurites; all stigmopleurites discrete, i.e., not fused with associated tergites or intercalary pleurites; possibly differing from all known genera in possessing a distinct pair of terminal (or anal) pores.

*Empherozoster* seems most like *Garriscaphus* and *Gosiphilus*, for in all three: 1) *major* paratergites and ultimate pretarsi are absent; 2) the coxopleura are cavitate or fossulate, their pores essentially cryptic, not uniformly dispersed over the exposed surface; 3) pore-fields occur on the rear body sternites as well as on those of the middle and anterior body thirds. Important distinctions between the new genus and *Garriscaphus* appear to include the following. *Garriscaphus*: prehensorial ungula with a distinct but small basal denticle; ultimate sternite broad; body constricted behind the head; coxopleural pores "along border of sternite" (and tergite?); anal pores absent?. *Empherozoster*: ungula without basal denticle; ultimate sternite long and narrow; body not constricted behind head; coxopleural pores concealed ventrally in pits, not in elongate fossulae, dorsally in weakly defined pits; anal pores present.

The new genus seems most like the apparently (see Note C) widely dispersed *Gosiphilus*, at least differing as follows. *Gosiphilus*: intercalary paratergites present at least on anterior segments in all specimens known to me; prosternal sclerotic lines prominent in most, meeting the condyles (see Note A); ultimate pedal sternite often much broader than long; antennae in most proximally flattened and distally attenuate, in some proximally subcylindrical; 1st maxillary lappets present, at least in some and probably in all; anal pores absent in the type and in all specimens known to me. *Empherozoster*: intercalary paratergites absent; prosternal sclerotic lines absent, i.e., not passing across prosternum to meet condyles; ultimate pedal sternite longer than width at midlength, comparatively narrow; antennae proximally compressed laterally, these articles distinctly longer than wide, distally not attenuate; 1st maxillary lappets absent; anal pores present.

Apparently the most striking characters of *Empherozoster* are the peculiar antennae, the lack of *intercalary* paratergites, the lack of 1st maxillary lappets, and the presence of anal pores. Until discovery of *antaeus* it was assumed that anal pores were absent throughout the Himantariidae. The intercalary paratergites, not to be confused with *major* paratergites (see Attems 1929, Chalande and Ribaut 1909), occur in every specimen of North American himantariid that I have seen. It is interesting to note that Verhoeff specifically mentions their absence in his Bolivian species (23, p. 126).

It would be desirable obviously to be able to employ many other important characters as well. Most have been extensively discussed and lucidly figured by Chalande and Ribaut (4); unfortunately subsequent authors have not always taken full advantage of their exemplary contribution, so that a fuller and more confident comparative treatment is not possible at this time.

Type-species: *Empherozoster antaeus*, new species. (Original designation and monotypic).

#### ***Empherozoster antaeus*, new species**

Holotype: ♀. New Mexico, Eddy County, Carlsbad Caverns National Park, Spider Cave; from dry silt beds about 100 feet inside entrance. December 10, 1958; James K. Baker, leg. U. S. National Museum Myriapod Collection, No. 2529.

INTRODUCTORY. Length, 43 mm. Pedal segments, 63. Color: antennae, cephalic plate, prehensorial segment, basal plate light sordid yellow to tan-yellow; tergites, pleurites, legs, sternites pale sordid yellow to yellowish-white.

ANTENNAE (fig. 1). Length, 3.2 mm. Shape: distally not attenuate; articles 2-5 compressed laterally (not depressed dorso-ventrally), each distinctly much longer than wide; articles 6-14 each essentially cylindrical in cross section, not flattened or compressed, each slightly longer than wide; articles 11-13 submoniliform, the 14th much longer than wide. Setae: articles 1-5 sparsely clothed with short setae; articles 6-14 densely, uniformly clothed with very short straight setae. Ultimate article: on each side just posterior to midlength with an ovate depres-

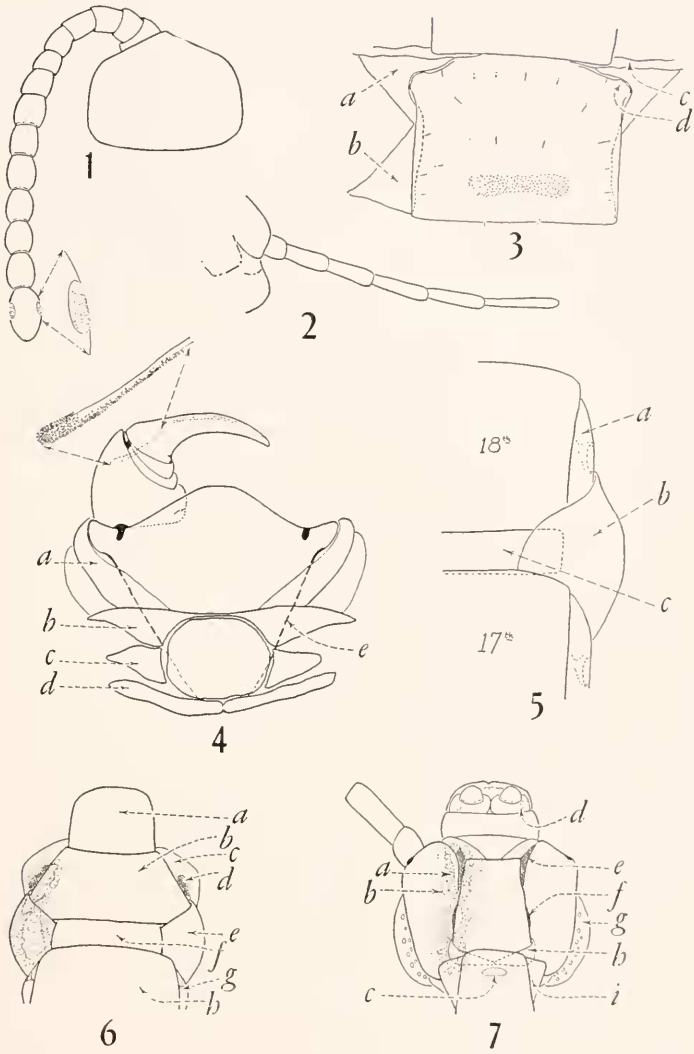
sion, this densely packed with short, thick, apically blunt modified setae (chemoreceptors?). **CEPHALIC PLATE** (fig. 1). Length, 0.83 mm.; width 1.24 mm. Shape: antero-lateral margins meeting in an obtuse angle to form a pointed rostrum; sides slightly diverging posteriorly; rear corners rounded; posterior margin straight and slightly overlapping the basal plate. Clothed very sparsely with short pale setae. Uniformly finely areolate; without sutures or sulci; frontal plate not discernibly discrete (even by transmitted light). Prebasal plate apparently absent. **CLYPEUS** (fig. 8). Paraclypeal sutures present but very obscure. Transbuccal sutures absent. Anterior portion of inner edge of each bucca strongly sclerotized to form an elongate plate whose inner edge is elevated into a short ridge. Clypeus vaguely divided into an anterior coarsely areolate and a posterior very smoothly areolate portion. Setae rather short and thick, disposed as shown. Entire lower margin of clypeus bordering the labrum developed into a strongly sclerotized band, this concolorous with labrum and much paler than remainder of clypeus. **LABRUM** (fig. 8). Completely separated from clypeus by a membranous strip, this is broad laterally but much narrower medially. Lateral labral extensions very narrow, only slightly indented at points of articulation with the fulturae. Central embayment deep and broad, the diastema between the two central teeth essentially dividing the labrum into right and left halves. Teeth: right, 9; left 9 or 10; each strong, well sclerotized, concolorous with rest of labrum. **MANDIBLE**. With one deeply pigmented dentate lamella, its long axis at a slight angle to the distal mandibular edge, occupying slightly less than one-fourth of the width of the distal mandibular edge, with 7 dark, strong, blunt teeth and 1 or 2 hyaline weak teeth. With 10 well developed pectinate lamellae, the long axis of each approximately perpendicular to the distal mandibular edge, their teeth hyaline, with parallel sides, on each lamella decreasing in length, the longest lamellae with 20-24 such teeth. **FIRST MAXILLAE** (fig. 9). Telopodite distinctly bipartite, entirely without lappets or vestiges thereof. Medial lobes separated by a deep, narrow cleft that cuts the coxosternum very deeply; each lobe very indis-

tinctly separated from coxosternum; each with a hyaline, nipple-like distal extension. Coxosternum medially very weakly areolate and weakly sclerotized, almost membranous; entirely without lappets. SECOND MAXILLAE (fig. 9). Anterior margin with a deep diastema, without a midlongitudinal sulcus or groove or any other indication of midlongitudinal division. Pore openings lateral, subsemicircular, very weakly defined. Setae rather robust and short; antero-medial to each pore opening with a small group of short conical alveolate sensory cones (modified setae). Telopodite dorsally and ventrally with rather robust setae; first article bicondylic; terminal claw robust, with 2 stout basal spurs, apically flat and rounded, inner surface broad and shallowly concave, the concave surface not visible from ventral aspect, being directed dorso-anteriorly. PROSTERNUM (fig. 4). Exposed portion very short and wide, the rear concealed parts extending posteriorly to level of rear of first pedal sternite. Anteriorly not denticulate or diastemate. Subcondylic sclerotic lines (chitin lines) absent, that is, not extend-

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*Empherzoster antacus*, holotype. Figs. 1-7

1. Cephalic plate and left antenna; dorsal. Setae deleted. Inner patch of sensilla of 14th article shown *in situ* and enlarged.
2. Left ultimate leg; ventral. Setae deleted.
3. 4th pedal sternite; ventral. Setae shown. a, procoxal pleurite. b, metacoxal pleurite. c, intercalary sternite. d, slight extension of sternite passing under procoxal pleurite.
4. Prehensorial segment and adjacent parts; ventral. Setae deleted. Poison calyx shown *in situ* and enlarged. a, pleurite. b, 1st pedal procoxal pleurite. c, 1st pedal metacoxal pleurite. d, intercalary sternite. e, concealed margin of posterior prosternal extension.
5. 17th and 18th pedal tergites and adjacent sclerites; dorsal. a, stigmopleurite. b, intercalary pleurite. c, intercalary tergite (or pretergite), lateral edge concealed beneath pleurite. Setae deleted.
6. Posterior end of body; dorsal. a, postpedal tergum. b, ultimate pedal tergite. c, exposed part of coxopleuron. d, exposed portion of rear coxopleural pit. e, intercalary pleurite of ultimate pedal pretergite. f, ultimate pedal pretergite. g, penultimate pedal stigmopleurite. h, penultimate pedal tergite.
7. Posterior end of body; ventral. Setae deleted. a, concealed pore-canals of rear pore-pit. b, concealed glands of rear pore-pit. c, pore-field of penultimate pedal sternite. d, concealed terminal (or anal) pore, lying dorsal to gonopod. e, exposed part of rear pore-pit. f, exposed part of middle pore-pit. g, undersurface of right ultimate pleurite of pretergite, showing pore-openings. h, ultimate pedal pre-sternite. i, penultimate pedal metacoxal pleurite.



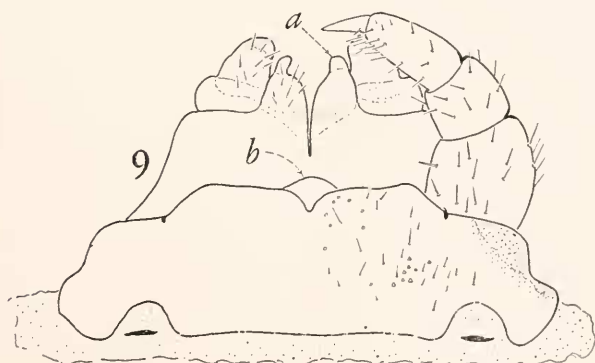
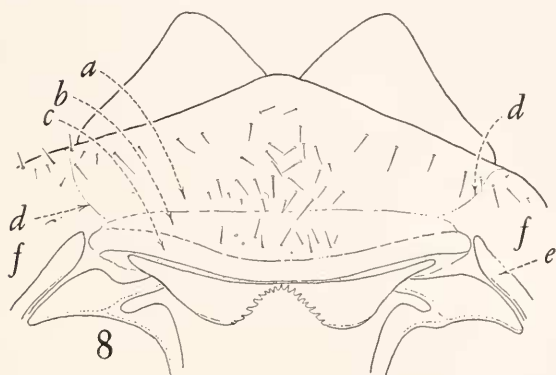
Figs. 1-7

ing across corner of prosternum toward and connecting with condyles. Ventral surface without sutures or grooves; uniformly finely, granularly areolate; uniformly very sparsely clothed with short setae. PREHENSORS (fig. 4). Not attaining frontal margin of head when closed. Ventral edge of ungula smooth, not serrulate; inner surface broad and shallowly concave, the concave surface not visible from ventral aspect, directed dorso-anteriorly; base of ungula (claw) without a denticle. Poison calyx extremely elongate, extending into trochanteroprefemur from proximal extremity of blade proper; poison canal opening on outer surface of blade just short of tip; outlines of poison gland extremely vague, not traceable with precision, apparently passing out of telopodite into prehensorial segment (dorsal to prosternum). Trochanteroprefemur ventrally sparsely but dorsally densely setose. Tibioid and femuroid without denticles.

TERGITES (fig. 5). Basal plate very broad, not suturate or grooved, its anterior margin beneath overhanging cephalic plate. Remaining tergites (except ultimate pedal tergite) as follows. Setae very sparse, minute; surface finely granularly areolate. The large intercalary pleurites reflected dorsally to cover outer corner of each major tergite and outer end of each intercalary tergite, the latter entirely without primary or secondary paratergites (preparatergites). An occasional tergite very indistinctly bisulcate, i.e., paired longitudinal sulci evidently present but extremely obscure. PLEURITES. Major and intercalary paratergites entirely absent. Stigmopleurites discrete, i.e., not fused with adjacent tergites or intercalary pleurites; penultimate pedal stigmopleurite similarly discrete. Spiracles of anterior third of body broadly elliptical, their long axes nearly horizontal, i.e., nearly parallel with the long axis of the body. STERNITES (fig. 3). Not suturate or sulcate; without stigmalike pouches or pits, depressions or similar special fossae. Sternites of anterior third of body somewhat wider than long, thereafter becoming longer and narrower; those on posterior third of body with long dimension greater than width at midlength, i.e., essentially longer than wide. Pedal sternites 2 through the



penultimate each with a pronounced pore-field; each pore-field very thin (antero-posteriorly) and extremely wide (from side to side), none is raised or discernibly depressed. Sternital setae very sparse, minute. LEGS. Dorsal orange articular condyles



*Emphrozoster antaeus*, holotype. Figs. 8, 9

8. Clypeus, labrum and adjacent parts; ventral. All but antennal setae shown. a, anterior portion of clypeus, areolation granular, pronounced. b, posterior portion of clypeus, areolation weak, vague. c, strongly sclerotized clypeal strip. d, paraclypeal sutures. e, sclerotized inner edge of left bucca. f, bucca.
9. 1st and 2nd maxillae; ventral. All setae shown on left side of 2nd maxillae and on right side of 1st maxillae. 1st maxillae somewhat displaced anteriorly from original position. a, nipple-like extension of medial lobes of 1st maxillae (possibly artifacts). b, posterior medial, free margin of 1st maxillae, displaced anteriorly.

contrasting notably with yellowish-white leg surfaces. Essentially glabrous. Pretarsi relatively long, compressed laterally, deep red-brown in color, narrowly concave beneath; pretarsal accessory claws equal in length, robust and very long, at least two-thirds as long as the associated claw proper.<sup>4</sup>

ULTIMATE PEDAL SEGMENT (figs. 2, 6, 7). Pretergite separated from its huge intercalary pleurites by sutures, these pleurites overlapping each lateral edge of their pretergite and completely concealing the anterior part of each coxopleuron from above. Tergite trapezoidal, very broad, sides strongly convergent posteriorly, the rear margin nearly straight; very sparsely and shortly setose. By contrast the tergum of the postpedal segments is subdensely setose. Presternite with convergent posterior margins, mostly concealed; medially essentially (or actually?) divided. Sternite much longer than width at midlength, its sides slightly convergent, the rear margin nearly straight; sparsely setose. Each coxopleuron elongate, extending forward nearly to base of penultimate leg, largely covered by tergite and pleurites; ventro-posteriorly slightly swollen; each with three ventral subsurface pits, the most anterior of these completely concealed; with two long poorly defined dorsal pits, the posterior of these slightly exposed; with numerous sclerotic gland canals opening into all five pits, gland canals and glands situated in coxopleuron, under sternite and presternite, on underside of pleurites, under lateral and anterior margins of tergite. Legs extremely long and thin, much longer than the penultimates; each with 6 articles distal to the coxopleuron, i.e., with two tarsal articles; pretarsus totally absent; all articles sparsely clothed with short straight setae. POSTPEDAL SEGMENTS (fig. 7). Gonopods completely separated from each other; each consists of two distinct, swollen segments. With a distinct pair of terminal (anal) pores.

(to be continued)

<sup>4</sup>The remarkable length of the pretarsal accessory claws is almost certainly significant interspecifically; it is probably a generic character as well. *Gosiphilus* specimens that I have seen, including the type-species, have broader, shorter pretarsi and accessory claws that never attain half the length of the pretarsus.